MARYLAND HEALTH CARE COMMISSION

Health Information Technology

AN ASSESSMENT OF MARYLAND HOSPITALS

September 2013

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MARYLAND HEALTH CARE COMMISSION

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INTRODUCTION

LIMITATIONS

This assessment evaluates trends in health information technology (health IT) adoption from 2008 through 2012. Information included in this assessment was mostly self-reported by hospitals through calendar year 2012 and was not audited. Responses may have been influenced by the respondent's perception of the questions and by the variations in the industry's definitions of the technology.

OVERVIEW

Optimized use of health IT among disparate health care organizations has the potential to reduce health care costs,[1] create efficiencies, and improve communications and quality of care.[2] Health IT serves as the infrastructure to enable care transformation by improving the flow of information across health care systems.[3] The Health Information Technology for Economic and Clinical Health (HITECH) Act, enacted as part of the American Recovery and Reinvestment Act of 2009 (ARRA), included roughly $25.9 billion to promote the adoption and use of federally certified health information technologies.[4] Over the past year, hospitals have continued to take advantage of the incentives available through HITECH for the adoption and meaningful use (MU) of health IT.[5] To demonstrate MU of health IT and receive an incentive payment, eligible hospitals (EHs) must meet certain requirements in their use of the electronic health record (EHR) system, as identified in the Centers for Medicare & Medicaid Services (CMS) Final Rules.[6, 7] The MU requirements were developed to progress in three phases, or stages, and require more advanced use of health IT over a five year period.[8]

This is the fifth year the Maryland Health Care Commission (MHCC) has conducted its annual *Hospital Health Information Technology Survey* (survey) with Chief Information Officers (CIOs) of all 46 Maryland acute care hospitals.[9] The survey captures health IT adoption by Maryland hospitals regarding the following technologies: EHRs; computerized physician order entry (CPOE); electronic prescribing (e-prescribing); electronic medication administration records (eMARs); bar code medication administration (BCMA); infection surveillance software (ISS); statewide health information exchange (HIE); and telemedicine.[10] CIOs identified the number of hospital units where technologies have been adopted (fully or partially). Hospitals that indicated they have

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[1] In 2010, U.S. health expenditures were roughly $2.6 trillion; about 31 percent of these costs were attributed to hospital expenditures. U.S. Department of Health and Human Services, *U.S. National Health Expenditure Accounts*. Available at: https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/index.html?redirect=/NationalHealthExpendData/02_NationalHealthAccountsHistorical.asp#TopOfPage.

[2] Health Affairs, *The Effect of Health Information Technology on Quality in U.S. Hospitals*, 2010.

[3] The Office of the National Coordinator for Health Information Technology (ONC), *Update on the Adoption of Health Information Technology and Related Efforts to Facilitate the Electronic Use and Exchange of Health Information,* June 2013.

[4] AMIA, *Enhancing patient safety and quality of care by improving the usability of electronic health record systems: recommendations from AMIA*, February 2013. Available at: http://jamia.bmj.com/content/early/2013/01/24/amiajnl-2012-001458.full.

[5] An overview of Meaningful Use is available at: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html.

[6] 42 C.F.R. § 412, 413, 422, et. al. (2010) and 42 C.F.R § 412, 413, and 495. (2012)

[7] Eligible professionals (EPs) and critical access hospitals may also participate in the federal incentive program. EPs for the Medicare program include providers who have at least one Medicare patient and are: doctors of medicine, osteopathy, dental surgery, dental medicine, podiatry, optometry, or chiropractors. EPs for the Medicaid program must meet the minimum 30 percent Medicaid patient volume threshold or 20 percent for pediatricians and be one of the following: Doctor of Medicine or Doctor of Osteopathic Medicine, dentists, nurse practitioners, certified nurse-midwives, or physician assistants (working for a federally qualified health center only).

[8] 42 C.F.R. § 412, 413, 422, et. al. (2010) and 42 C.F.R § 412, 413, and 495. (2012).

[9] See Appendix A for the survey questions.

[10] See Appendix B for a glossary of terms.

not adopted a technology were asked to identify their prospective plans for implementation such as if they plan to assess and/or implement the technology within the next 12 months or beyond or whether they were undecided about plans to adopt the technology.

This assessment benchmarks Maryland hospital health IT adoption against national hospital trends. This is the first year that the survey included questions related to patient portal adoption, MU and federal EHR incentive payments. The survey results are used to evaluate opportunities for increasing hospital health IT adoption and optimizing implementation. Since 2008, the health IT adoption rate in Maryland hospitals has increased by roughly 25 percent. Additionally, Maryland hospitals exceed national adoption rates in eight out of ten categories assessed where national comparisons are available.

Overview of Hospital Health IT Adoption in Maryland and Nationally

Technology	2008 n=44 # of Hospitals	2009 n=47 # of Hospitals	2010 n=46 # of Hospitals	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals	Maryland Hospitals 2012 %	Hospitals Nationally[6] %
EHRs	34	38	41	41	41[4]	7	83[5]	44
CPOE	24	32	36	38	39	15	85	72
e-Prescribing	4	10	9	17[3]	10	7	22	61
eMAR	24	37	37	40	42	18	91	60
BCMA	14	27	29	32	36	22	78	27
ISS	18	19	17	16	24	6	52	20-25
Health IT adoption rate[1] (%)	**45**	**63**	**61**	**67**	**70**	**25**	**70**	**48**
CDS	17	28	33	38	31	14	67	87
Patient Portal	N/A[2]	N/A	N/A	N/A	14	-	30	26
HIE Data Submission	N/A	N/A	5	46	46	46[7]	100	30
Telemedicine	N/A	N/A	N/A	25	21	-4[8]	46	-[9]
MU Attestation	N/A	N/A	N/A	N/A	25	-	54	-[9]
Federal Incentive Payment	N/A	N/A	N/A	N/A	38	-	83	80

Notes:

1. *The hospital health IT adoption rate was calculated using hospital adoption of each of the following six technologies since 2008: EHRs; CPOE; e-prescribing; eMAR; BCMA; and ISS.*
2. *N/A indicates that the identified technology was not assessed during the specified reporting period.*
3. *The fluctuation is largely attributed to survey respondent perception of definitions of e-prescribing.*
4. *Maryland hospitals that have not adopted an EHR cited various reasons, including vendor installation support issues and cost.*
5. *EHR adoption is measured using basic EHR adoption as defined by the Office of the National Coordinator for Health Information Technology. For more information, see the EHR section on page three.*
6. *For sources of national data, see the specific technology section of the report.*
7. *This technology was added to the assessment in 2010; 2010 to 2012 change noted.*
8. *This technology was added to the assessment in 2011; 2011 to 2012 change noted.*
9. *National comparison data not available.*

HOSPITAL HEALTH IT ADOPTION BY TECHNOLOGY

ELECTRONIC HEALTH RECORDS

Description

When used effectively, EHRs can reduce medical errors and lead to health care savings and better health outcomes. Financial benefits are mostly attributed to efficiency gains.[11, 12] In Maryland, 41 of 46 hospitals reported that they adopted an EHR. Maryland hospitals that have not adopted an EHR cited various reasons, including vendor installation support issues and cost.

Comparison

Roughly 44 percent of acute care hospitals nationally have adopted a basic EHR, compared to about 83 percent of Maryland hospitals that have a basic EHR.[13]

EHR Adoption	2008 n=44 # of Hospitals	2009 n=47 # of Hospitals	2010 n=46 # of Hospitals	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals
Implemented	34	38	41	41	41	7
Fully	*23*	*26*	*27*	*15**	*28*	*2*
Partially	*11*	*12*	*14*	*26*	*13*	*6*
Planning	10	9	5	5	5	(-5)
To implement	*1*	*2*	*1*	*3*	*5*	*(4)*
To assess	*4*	*3*	*4*	*2*	*0*	*(-4)*
Undecided	*5*	*4*	*0*	*0*	*0*	*(-5)*

**The variation is largely attributed to survey respondents' perception of fully implemented.*

COMPUTERIZED PHYSICIAN ORDER ENTRY

Description

CPOE enables providers to input medication orders electronically. Orders are stored and documented in a digitized format. In 2012, all Maryland hospitals reported they were implementing or planned to implement CPOE.

Comparison

Approximately 72 percent of hospitals nationally have implemented CPOE, as compared to nearly 85 percent of hospitals in Maryland.[14] Adoption has grown nationally by about 41 percent between 2011 and 2012 largely due to CPOE MU requirements for receiving a federal incentive payment.

CPOE Adoption	2008 n=44 # of Hospitals	2009 n=47 # of Hospitals	2010 n=46 # of Hospitals	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals
Implemented	24	32	36	38	39	15
Fully	*17*	*15*	*16*	*7**	*13*	*(-4)*
Partially	*7*	*17*	*20*	*31*	*26*	*19*
Planning	20	15	10	8	7	(-13)
To implement	*9*	*8*	*3*	*6*	*7*	*(-2)*
To assess	*9*	*3*	*5*	*0*	*0*	*(-9)*
Undecided	*2*	*4*	*2*	*2*	*0*	*(-2)*

**The variation is largely attributed to survey respondents' perception of the definitions of CPOE.*

[11] Health Affairs, *Can Electronic Medical Record Systems Transform Health Care? Potential Health Benefits, Savings, and Costs*, 24(5), September 2005.
[12] Health Affairs, *The Value of Electronic Health Records In Community Health Centers*: *Policy Implications*, 26(1), January, 2007.
[13] Federal EHR adoption rates define a basic set of EHR functions (basic EHR), which includes: patient demographics, physician notes, nursing assessments, problem lists, medication lists, discharge summaries, laboratory reports, radiology reports, diagnostic-test results, and medications. ONC, *Update on the Adoption of Health Information Technology and Related Efforts to Facilitate the Electronic Use and Exchange of Health Information,* June 2013.
[14] ONC, *ONC Data Brief: Hospital Adoption of Electronic Health Record Technology to Meet Meaningful Use Objectives: 2008-2012,* March 2013.

CLINICAL DECISION SUPPORT

Description

CDS uses evidence based guidelines and patient-specific information to assist providers in making treatment decisions and to enhance patient care.[15] CDS presents users with warnings about adverse drug interactions based upon a patient's known medication list, at the time a new prescription is being ordered.

Comparison

Nationally, about 87 percent of hospitals have implemented at least one CDS functionality, which utilizes patient data elements and electronically generates automatic, real-time notifications and care suggestions as required by MU. MU does not specify the type of CDS functionality that needs to be enabled to meet the MU requirements.[16] Comparatively, about 67 percent of hospitals in Maryland have implemented at least one functionality of CDS.

CDS Adoption	2008 n=24* # of Hospitals	2009 n=32 # of Hospitals	2010 n=36 # of Hospitals	2011 n=38 # of Hospitals	2012 n=39 # of Hospitals	2008 – 2012 Change # of Hospitals
Medication	17	28	33	38	N/A**	21***
Diagnosis	10	19	21	27	31	21

**From 2008 – 2011 hospitals that had implemented CPOE were asked about CDS implementation. In 2012 all hospitals were asked about CDS implementation.*

***In 2012, the survey was updated to capture the use of CDS consistent with MU; medications were not included with the CDS application question.*

**** Change noted from 2008 – 2011.*

ELECTRONIC PRESCRIBING

Description

e-Prescribing is the electronic transfer of prescription data between providers and pharmacies. e-Prescribing functions include messages regarding new prescriptions, prescription changes, refill requests, prescription fill status notification, prescription cancellation, and medication history.[17]

Comparison

Nationally, roughly 61 percent of hospitals have partially or fully implemented e-prescribing; approximately 22 percent of Maryland hospitals reported implementing e-prescribing.[18]

e-Prescribing Adoption	2008 n=44 # of Hospitals	2009 n=47 # of Hospitals	2010 n=46 # of Hospitals	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals
Implemented	4	10	9*	17	10*	6
Fully	*N/A***	*N/A*	*N/A*	*4*	*0*	*(-4)*
Partially	*N/A*	*N/A*	*N/A*	*13*	*10*	*(-3)*
Planning	40	37	37	29	36	(-5)
To implement	*4*	*7*	*10*	*17*	*29*	*25*
To assess	*8*	*17*	*16*	*7*	*6*	*(-2)*
Undecided	*28*	*13*	*11*	*5*	*1*	*(-27)*

**Staff follow up with CIOs revealed that the variation is largely attributed to survey respondent perception of definition of e-prescribing.*

***N/A indicates that the identified technology was not assessed during the specified reporting period.*

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[15] ONC, Decision-Support System: http://www.healthit.gov/policy-researchers-implementers/glossary.

[16] ONC, *ONC Data Brief: Hospital Adoption of Electronic Health Record Technology to Meet Meaningful Use Objectives: 2008-2012,* March 2013.

[17] National Council for Prescription Drug Programs (November 2011). Available at: http://www.ncpdp.org/pdf/Eprescribing_fact_sheet.pdf.

[18] Anuja Vaidya, *Survey: 88% of Hospitals Implementing Health Information Exchange*, April 2013. Available at: http://www.beckershospitalreview.com/healthcare-information-technology/survey-88-of-hospitals-implementing-health-information-exchange.html.

ELECTRONIC MEDICATION ADMINISTRATION RECORDS

Description

eMAR is medication administration software that when integrated with CPOE, can track and monitor medication orders.[19] It has the potential to prevent errors caused by handwritten prescriptions or human dosage miscalculations.

Comparison

About 60 percent of hospitals nationally have adopted eMAR, compared with roughly 91 percent of Maryland hospitals.[20] MU Stage 2,[21] which requires hospitals to utilize eMAR for more than 10 percent of medication orders, is expected to increase eMAR adoption in 2014 as hospitals begin meeting the requirements of MU Stage 2.

eMAR Adoption	**2008** n=44 # of Hospitals	**2009** n=47 # of Hospitals	**2010** n=46 # of Hospitals	**2011** n=46 # of Hospitals	**2012** n=46 # of Hospitals	**2008 – 2012 Change** # of Hospitals
Implemented	24	37	37	40	42	18
Fully	*10*	*15*	*14*	*8**	*8*	*(-2)*
Partially	*14*	*22*	*23*	*32*	*34*	*20*
Planning	20	10	9	6	4	(-16)
To implement	*13*	*2*	*3*	*3*	*4*	*(-9)*
To assess	*5*	*5*	*5*	*2*	*0*	*(-5)*
Undecided	*2*	*3*	*1*	*1*	*0*	*(-2)*

BARCODE MEDICATION ADMINISTRATION RECORDS

Description

BCMA utilizes bar code technology to manage the inventory of filled prescriptions and administration to patients. BCMA reduces dangerous and costly medication errors. One study by the Institute of Medicine estimates that each hospitalized patient is subject to one medication error per day, on average, and that a quarter of all medication errors are preventable.[22]

Comparison

The national adoption rate of BCMA among hospitals is about 27 percent compared to 78 percent for Maryland hospitals. Implementation of BCMA in Maryland hospitals has more than doubled since 2008. BCMA adoption within hospitals is expected to continue to increase in order to meet MU Stage 2 requirements; hospitals must use bar codes to verify 10 percent of medication orders.

BCMA Adoption	**2008** n=44 # of Hospitals	**2009** n=47 # of Hospitals	**2010** n=46 # of Hospitals	**2011** n=46 # of Hospitals	**2012** n=46 # of Hospitals	**2008 – 2012 Change** # of Hospitals
Implemented	14	27	29	32	36	22
Fully	*1*	*6*	*5*	*5*	*6*	*5*
Partially	*13*	*21*	*24*	*27*	*30*	*17*
Planning	30	20	17	14	10	(-20)
To implement	*18*	*6*	*8*	*10*	*9*	*(-9)*
To assess	*4*	*6*	*5*	*1*	*0*	*(-4)*
Undecided	*8*	*8*	*4*	*3*	*1*	*(-7)*

[19] American Hospital Association, *Critical Access Hospitals and Meaningful Use of Health Information Technology,* February 2010. Available at: http://www.aha.org/content/00-10/CAHandMngflUse-FLEX-10Feb.pdf.

[20] HIMSS Analytics, *The State of U.S. Hospitals Relative to Achieving Meaningful Use Measurements,* 2009. Available at: http://www.himssanalytics.org/docs/HA_ARRA_100509.pdf.

[21] On September 4, 2012, CMS published a final rule that specifies the Stage 2 criteria that eligible hospitals must meet in order to continue to participate in the Medicare and Medicaid EHR Incentive Programs. All providers must achieve MU under the Stage 1 criteria before moving to Stage 2. The earliest that the Stage 2 criteria will be effective for eligible hospitals is fiscal year 2014.

[22] Journal of American Medical Informatics Association, *Reduction in Hospitals Due to Adoption of Computerized Provider Order Systems*, January 2013.

INFECTION SURVEILLANCE SOFTWARE

Description

ISS helps hospitals identify hospital acquired infections in real-time and report infection data to government agencies. ISS monitors laboratory results, surgical procedures, and pharmacy orders, among other things, to identify hospital acquired infections. The effectiveness of ISS depends on the level of integration between the software and other hospital systems, as well as the hospital staff's monitoring and reacting to alerts.

Comparison

Changes in Medicare reimbursement policies, particularly non-payment for hospital acquired conditions, have led to an increase in ISS adoption.[23] KLAS[24] estimates that as of 2011, roughly 20 to 25 percent of hospitals nationally are using ISS, which is an increase of 10 to 15 percent from 2009.[25] Maryland hospital adoption of ISS is about 52 percent and has increased by roughly 11 percent since 2008.

ISS Adoption	2008 n=44 # of Hospitals	2009 n=47 # of Hospitals	2010 n=46 # of Hospitals	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals
Implemented	18	19	17	16	24	6
Planning	26	28	29	30	22	(-4)
To implement	8	2	2	11	7	*(-1)*
To assess	*7*	*11*	*11*	*8*	*2*	*(-5)*
Undecided	*11*	*15*	*16*	*11*	*13*	*2*

PATIENT PORTALS

Description

A patient portal offers patients and their designated caregivers secure access to a patient's protected health information. The portal may be accessible via a web browser or proprietary software and usually provides patients with access to clinical summaries and lab results. Most patient portals allow patients to contact providers via secure email and to request prescription refills, among other things.

Comparison

In 2012, nearly 30 percent of Maryland hospitals reported having implemented a patient portal. The Healthcare Information and Management Systems Society (HIMSS) estimate that almost 26 percent of hospitals nationally have implemented a patient portal.[26] Hospital adoption of patient portals is expected to increase as MU Stage 2 requires 10 percent of patients to be able to view, download or transmit their summary of care record.

Patient Portal Adoption	2012* n=46 # of Hospitals
Implemented	14
Planning	32
To implement	*24*
To assess	*8*
Undecided	*0*

**This is the first year the survey asked questions related to patient portals.*

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[23] KLAS, *Infection Control 2011: Better Tools + More Data = Less Infection?* June 2011.

[24] KLAS is a research firm specializing in monitoring and reporting the performance of health care vendors. Additional information is available at: http://www.klasresearch.com/.

[25] KLAS, *Infection Control 2011: Better Tools + More Data = Less Infection?* June 2011.

[26] HIMSS Analytics, *The State of U.S. Hospitals Relative to Achieving Meaningful Use Measurements*, 2009. Available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=8&cad=rja&ved=0CFIQFjAH&url=http%3A%2F%2Fwww.himssanalytics.org%2Fdocs%2FHA_ARRA_100509.pdf&ei=rOTmUdfGPOzj4AOwk4CYAw&usg=AFQjCNF88GCoZfwS48dkxMjSfbwGJn46hA&bvm=bv.49405654,d.dmg.

HEALTH INFORMATION EXCHANGE

HIE enables the electronic transfer of health information among disparate health care settings. The Chesapeake Regional Information System for our Patients (CRISP), Maryland's State-Designated HIE, offers several services for health care providers to share clinical information. One of the services offered is the CRISP portal, a standalone web-based system that contains patient health information from organizations connected to the HIE. The CRISP portal may be queried by providers and includes patient demographics, laboratory results, radiology reports, discharge summaries, operative and consult notes, and medication fill history. The data submitted to CRISP is used to generate automatic, real-time alerts to ambulatory care practices in the event that their patient had a hospital encounter.

HOSPITAL DATA SUBMISSION TO CRISP AND USE OF HIE SERVICES

A recent study found that roughly 30 percent of hospitals nationally now participate with an HIE.[27] Hospital adoption of the CRISP portal in Maryland is nearly 41 percent. All Maryland hospitals submit admission, discharge, and transfer (ADT) information to CRISP, and are at various stages of data submission for laboratory results, radiology reports, and transcribed documents.

Hospital n=46	**Current Status of Submission***				**Use of Services***	
	ADT Data	Laboratory Reports	Radiology Reports	Transcribed Documents	Portal Adoption	ENS
Anne Arundel Medical Center	✓	✓	✓		✓	
Atlantic General Hospital	✓	✓	✓	✓	✓	
Baltimore Washington Medical Center	✓				✓	
Bon Secours Baltimore Health System	✓					
Calvert Memorial Hospital	✓	✓	✓	✓		
Carroll Hospital Center	✓	✓	✓	✓		
Civista Medical Center	✓					
Doctors Community Hospital	✓	✓				
Edward McCready Memorial Hospital	✓	✓				
Fort Washington Hospital	✓	✓	✓	✓	✓	
Frederick Memorial Hospital	✓	✓	✓		✓	
Garrett County Memorial Hospital	✓	✓	✓			
Greater Baltimore Medical Center	✓	✓	✓	✓	✓	
Harford Memorial Hospital	✓	✓	✓	✓	✓	
Holy Cross Hospital	✓	✓	✓	✓	✓	
Howard County General Hospital	✓	✓	✓	✓	✓	
Johns Hopkins Bayview Medical Center	✓		✓	✓	✓	
Johns Hopkins Hospital	✓		✓	✓	✓	
Laurel Regional Hospital	✓			✓		

[27] Health Affairs, *Operational Health Information Exchanges Show Substantial Growth, But Long-Term Funding Remains A Concern*, July 2013.

Hospital n=46	Current Status of Submission*				Use of Services*	
	ADT Data	Laboratory Reports	Radiology Reports	Transcribed Documents	Portal Adoption	ENS
MedStar Franklin Square Medical Center	✓	✓	✓	✓		
MedStar Good Samaritan Hospital	✓	✓	✓	✓		
MedStar Harbor Hospital	✓	✓	✓	✓		✓
MedStar Montgomery Medical Center	✓		✓	✓	✓	
MedStar Southern Maryland Hospital Center	✓		✓	✓		
MedStar St. Mary's Hospital	✓	✓	✓			
MedStar Union Memorial Hospital	✓	✓	✓			
Mercy Medical Center	✓		✓			
Meritus Medical Center	✓	✓	✓	✓		
Northwest Hospital Center	✓	✓	✓	✓		
Peninsula Regional Medical Center	✓					
Prince George's Hospital Center	✓			✓		
Shady Grove Adventist Hospital	✓	✓	✓	✓	✓	
Sinai Hospital	✓	✓	✓	✓		
St. Agnes Hospital	✓	✓	✓	✓	✓	
Suburban Hospital	✓	✓	✓	✓	✓	
Union Hospital of Cecil County	✓	✓	✓	✓		
University of Maryland Medical Center	✓			✓	✓	
University of Maryland Medical Center Midtown Campus						
University of Maryland Rehabilitation & Orthopedic Institute	✓			✓		
University of Maryland Shore Medical Center at Chester River Health	✓					
University of Maryland Shore Medical Center at Dorchester	✓					
University of Maryland Shore Medical Center at Easton	✓					
University of Maryland St. Joseph Medical Center	✓	✓	✓	✓	✓	✓
Upper Chesapeake Medical Center	✓	✓	✓	✓	✓	
Washington Adventist Hospital	✓	✓	✓	✓		
Western Maryland Health System	✓	✓	✓	✓	✓	
	46	**29**	**32**	**30**	**19**	**2**

**Data were obtained from CRISP as of December 2012.*

TELEMEDICINE

Description

Telemedicine is a means of delivering health care services remotely using technology. Recently the Maryland legislature passed and the Governor signed into law a requirement that State-regulated payers reimburse for services provided via telemedicine. Effective use of telemedicine can increase access to health care, reduce health disparities, and create efficiencies in health care delivery.[28, 29, 30, 31, 32]

Comparison

Although telemedicine technology has advanced in recent years, diffusion related to the number of services provided via telemedicine remains low.[33] Approximately 46 percent of Maryland hospitals reported using telemedicine. To date, 19 states have adopted laws that require payers to reimburse for telemedicine services similar to face-to-face consults. Roughly 44 states have some measure of telemedicine reimbursement for Medicaid in place. The American Telemedicine Association estimates about 200 telemedicine networks exist across the U.S., with half of hospitals nationwide utilizing some form of telemedicine services.

Telemedicine Adoption	2011 n=46 # of Hospitals	2012 n=46 # of Hospitals	2008 – 2012 Change # of Hospitals
Implemented	25	21	(-4)*
Planning	21	25	4
To implement	*5*	*10*	*5*
To assess	*1*	*1*	-
Undecided	*15*	*14*	-

**Hospitals that reported using telemedicine in 2011 and did not report using telemedicine in 2012 generally stated that they had implemented telemedicine pilot projects in 2011 that ended in 2012.*

TELEMEDICINE TECHNOLOGY

Maryland hospitals using telemedicine reported using telemedicine mostly for imaging and consultation.

Count	Hospital	Imaging		Diagnostic		Monitoring		Emergency		Consultation	
		# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units	# Unites	% Units
1	Anne Arundel Medical Center	0	0	1	3	0	0	0	0	1	3
2	Atlantic General Hospital	0	0	0	0	0	0	0	0	1	7
3	Baltimore Washington Medical Center	1	3	0	0	0	0	0	0	0	0
4	Bon Secours Baltimore Health System	0	0	1	9	1	9	0	0	1	9
5	Calvert Memorial Hospital	2	8	2	8	2	8	1	4	2	8
6	Carroll Hospital Center	0	0	0	0	1	8	0	0	0	0
7	Doctors Community Hospital	4	21	0	0	0	0	0	0	0	0
8	Frederick Memorial Hospital	4	17	2	8	4	17	3	13	4	17
9	Holy Cross Hospital	1	4	1	4	0	0	1	4	1	4

[28] Journal of Telemedicine and Telecare, *Systematic Review of Evidence for the Benefits of Telemedicine*, 8(1), March 2002.
[29] Journal of Telemedicine and Telecare, *Economic Evaluation in Telemedicine – Still Room for Improvement*, 16(5):229-231, May 2010.
[30] Neurology, *Long-Term Outcome after Thrombolysis in Telemedical Stroke Care,* 69(9): 898-903, August 2007.
[31] CNS Spectrums: First in Applied Neuroscience, *Can Telepsychiatry Replace In-Person Psychiatric Assessments? A Review and Meta-Analysis of Comparison Studies*, 10(5): 403-413, May 2005.
[32] Archives of Internal Medicine, *Impact of Telemedicine Intensive Care Unit Coverage on Patient Outcomes: A Systematic Review and Meta-analysis,* 171(6): 498-506, March, 2011.
[33] Telemedicine Journal, *Diffusion of Telemedicine: A Knowledge Barrier Perspective,* Fall 1999.

Count	Hospital	Imaging		Diagnostic		Monitoring		Emergency		Consultation	
		# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units	# Unites	% Units
10	Howard County General Hospital	1	3	0	0	0	0	0	0	0	0
11	Johns Hopkins Hospital	8	50	8	50	8	50	2	13	8	50
12	MedStar Franklin Square Medical Center	1	2	0	0	0	0	0	0	0	0
13	MedStar Good Samaritan Hospital	0	0	0	0	1	6	0	0	0	0
14	MedStar Montgomery Medical Center	0	0	0	0	0	0	1	6	1	6
15	MedStar St. Mary's Hospital	0	0	0	0	0	0	0	0	1	8
16	Mercy Medical Center	1	4	0	0	0	0	1	4	0	0
17	Meritus Medical Center	1	4	0	0	0	0	0	0	1	4
18	Peninsula Regional Medical Center	4	17	2	8	1	4	0	0	4	17
19	Suburban Hospital	1	7	0	0	0	0	0	0	0	0
20	Union Hospital of Cecil County	0	0	0	0	1	2	0	0	0	0
21	University of Maryland Medical Center	1	10	0	0	0	0	0	0	0	0
Totals	***Number of Units***	**30**	**6.4**	**17**	**3.6**	**19**	**4.1**	**9**	**1.9**	**25**	**5.3**
	Number of Hospitals	**14**		**7**		**8**		**6**		**11**	

TELEMEDICINE SERVICES

Maryland hospitals that are using telemedicine were asked to identify the type of technology they use for telemedicine. About 75 percent of hospitals reported they are using telemedicine software located on a desktop computer. In general, desktop software for telemedicine does not require purchasing additional equipment.

Count	Hospital	Desktop Software		Handheld Wireless		Home Devices		Interactive Video		Robotics	
		# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units
1	Anne Arundel Medical Center	2	6	0	0	0	0	0	0	0	0
2	Atlantic General Hospital	1	7	0	0	0	0	1	7	0	0
3	Bon Secours Baltimore Health System	0	0	0	0	0	0	0	0	1	9
4	Calvert Memorial Hospital	2	8	2	8	0	0	1	4	0	0
5	Carroll Hospital Center	0	0	0	0	1	8	0	0	0	0
6	Doctors Community Hospital	1	5	4	21	0	0	1	5	0	0
7	Frederick Memorial Hospital	4	17	4	17	0	0	2	16	0	0
8	Holy Cross Hospital	1	4	0	0	1	4	1	4	0	0
9	Howard County General Hospital	1	3	0	0	0	0	1	3	0	0
10	Johns Hopkins Hospital	8	50	0	0	8	50	8	50	0	0

Count	Hospital	Desktop Software		Handheld Wireless		Home Devices		Interactive Video		Robotics	
		# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units	# Units	% Units
11	MedStar Franklin Square Medical Center	1	2	0	0	0	0	0	0	0	0
12	MedStar Good Samaritan Hospital	0	0	1	6	0	0	0	0	0	0
13	MedStar Montgomery Medical Center	1	6	0	0	0	0	1	6	0	0
14	MedStar St. Mary's Hospital	0	0	0	0	1	8	0	0	0	0
15	Mercy Medical Center	1	4	0	0	0	0	0	0	0	0
16	Meritus Medical Center	1	4	1	4	0	0	0	0	0	0
17	Peninsula Regional Medical Center	0	0	0	0	0	0	4	17	0	0
18	Suburban Hospital	1	7	0	0	0	0	0	0	0	0
29	Union Hospital of Cecil County	1	4	0	0	0	0	1	4	0	0
20	University of Maryland Medical Center	1	10	0	0	0	0	1	10	0	0
Totals	***Number of Units***	**27**	**5.8**	**12**	**2.6**	**11**	**2.4**	**22**	**4.7**	**1**	**0.2**
	Number of Hospitals	**15**		**5**		**4**		**11**		**1**	

MEANINGFUL USE

The Medicare and Medicaid EHR incentive programs (incentive programs), which were enacted as part of the ARRA, aim to improve health and transform care delivery through the promotion of EHR adoption among health care entities.[34] It is anticipated that when EHR adoption is widespread, optimized EHR use will improve patient care, decrease health care costs, and increase provider efficiencies.[35] MU enables providers to capture and exchange clinical data, with the goal of improving patient outcomes through enhanced care delivery. The incentive program offers financial payments to eligible providers and EHs that adopt a certified EHR system and demonstrate that they are meeting MU requirements determined by CMS.[36] The requirements progress in three phases, or stages.[37, 38] MU Stage 1 requirements focus on data collection and sharing. Stage 2 moves beyond data collection to using technology to improve patient care delivery.[39] Stage 3 requirements are under development and are expected to improve health care outcomes. The majority of Maryland hospitals that have attested to MU have exceeded most MU threshold requirements established by CMS.[40] Hospitals may receive incentive payments through Medicaid in their first year of participation through adopting, implementing, or upgrading to a certified EHR system or through achieving MU. The Medicare incentive program requires the achievement of MU by hospitals in the first year of participation and in subsequent years.

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[34] The New England Journal of Medicine, *The "Meaningful Use" Regulation for Electronic Health Records*, August 5, 2010. Available at: http://www.ncdhhs.gov/healthit/NEJMMUREG.pdf.
[35] Hawaii Journal of Medicine and Public Health, *Transforming and Improving Health Care through Meaningful Use of Health Information Technology*, April 2013. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3347738/.
[36] Additional information regarding the CMS EHR Incentive Programs and Meaningful Use is available at: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/index.html?redirect=/EHRIncentivePrograms/.
[37] An overview of Meaningful Use is available at: http://www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/Meaningful_Use.html.
[38] 42 CFR Parts 412,413, 422, et al.
[39] Healthcare IT News, Final rules for Stage 2 meaningful use released, August 2012. Available at: http://www.healthcareitnews.com/news/final-rules-stage-2-meaningful-use-released.
[40] Hospitals reported their achievement of the MU requirements as part of the survey. See Appendix C for detailed list of individual hospital achievement of MU required thresholds.

MEANINGFUL USE PAYMENTS

As of June 2013, nationally, approximately 80 percent of EHs have received about $9.2B in incentive payments.[41] As of 2012, approximately 83 percent of hospitals in Maryland had received incentive payments, totaling approximately $67.9M, and 25 hospitals, or approximately 54 percent, had attested to MU. The following hospitals received a federal incentive payment in calendar year 2011 and 2012 in descending order from the highest to the lowest incentive received.

2011

1. Frederick Memorial Hospital
2. Sinai Hospital
3. Northwest Hospital Center
4. Holy Cross Hospital

2012

1. Sinai Hospital
2. Johns Hopkins Bayview Medical Center
3. Mercy Medical Center
4. St Agnes Hospital
5. Johns Hopkins Hospital
6. Western Maryland Health System
7. Peninsula Regional Medical Center
8. Doctors Community Hospital
9. Anne Arundel Medical Center
10. MedStar St. Mary's Hospital
11. Frederick Memorial Hospital
12. University of Maryland Medical Center
13. Carroll Hospital Center
14. Meritus Medical Center
15. Northwest Hospital Center
16. Upper Chesapeake Medical Center
17. Calvert Memorial Hospital
18. University of Maryland Medical Center Midtown Campus
19. Greater Baltimore Medical Center
20. MedStar Montgomery Medical Center
21. MedStar Harbor Hospital
22. Atlantic General Hospital
23. Edward McCready Memorial Hospital
24. Washington Adventist Hospital
25. Union Hospital of Cecil County
26. Holy Cross Hospital
27. Shady Grove Adventist Hospital
28. Harford Memorial Hospital
29. Howard County General Hospital
30. MedStar Union Memorial Hospital
31. Fort Washington Hospital
32. Baltimore Washington Med Center
33. MedStar Good Samaritan Hospital
34. University of Maryland Shore Medical Center at Easton
35. Civista Medical Center
36. University of Maryland Shore Medical Center at Chester River Health
37. University of Maryland Rehabilitation & Orthopedic Institute
38. Suburban Hospital

The following hospitals did not receive incentive payments in calendar year 2011 and 2012 but may have received incentive payments in calendar year 2013.

1. Bon Secours Baltimore Health System
2. University of Maryland Shore Medical Center at Dorchester
3. Garrett County Memorial Hospital
4. Laurel Regional Hospital
5. MedStar Franklin Square Medical Center
6. Prince George's Hospital Center
7. MedStar Southern Maryland Hospital Center
8. University of Maryland St. Joseph Medical Center

[41] CMS, *Medicare & Medicaid EHR Incentive Programs: HIT Policy Committee*, August 2013. Available at: http://www.healthit.gov/sites/default/files/hitpc_august2013_nn.pptx.

REMARKS

The role of a hospital CIO is becoming more strategic as a result of health care reform. CIOs are placing far greater emphasis on implementing solutions that address issues around quality, improved patient outcomes, and patient safety. As the federal government pushes for greater use of technology in the health care industry to replace inefficient paper-based solutions, CIOs are increasingly becoming involved in strategy development and business operations. Generally speaking, the hard work and dedication of Maryland CIOs are the leading reason that hospital health IT adoption in Maryland exceeds national adoption rates.

The challenges of implementing comprehensive health IT solutions are not new to hospitals; however, their scope and urgency is far greater since the passage of the HITECH Act. HITECH provides funds to expand the adoption of EHRs in an effort to modernize the health care industry. About 83 percent of hospitals in Maryland have taken advantage of federal incentives to digitize health records.

The efficient use of health IT is considered to be the underpinning of health care reform. Implementing systems to support the increased privacy and security requirements and achieving interoperability of electronic health information is considered a difficult task by most hospitals. Over the next several years, hospitals will likely continue to build adaptive information-driven infrastructures that can support health care reform.

ACKNOWLEDGEMENTS

The MHCC would like thank the Chief Information Officers of the Maryland acute care hospitals for their contributions. The MHCC is fortunate that all 46 hospital executives donated their time and resources to contribute to the accuracy of this survey in its fifth year. Many thanks to Traci LaValle, Vice President, Financial Policy & Advocacy from the Maryland Hospital Association for her input on this assessment. Additionally, the MHCC acknowledges the contributions of the following individuals:

Anne Arundel Medical Center
Babette Vos
Director, Information Systems Applications

Atlantic General Hospital
Barbara Riddell
Vice President of Information Services

Baltimore Washington Medical Center
Jon Burns
Senior Vice President & Chief Information Officer

Bon Secours Hospital
Sanjay Purushotham
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Calvert Memorial Hospital
Ed Grogan
Vice President, Information Services & CIO

Carroll Hospital Center
Jennifer Moore
Interim Chief Information Officer

Civista Medical Center
Jon Burns
Senior Vice President & Chief Information Officer

Doctors Community Hospital
Alan Johnson
Chief Information Officer

Edward McCready Memorial Hospital
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Howard County General Hospital
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Johns Hopkins Bayview Medical Center
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Johns Hopkins Hospital
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Laurel Regional Hospital
Dennis Lilik
Chief Information Officer

MedStar Franklin Square Medical Center
Catherine Szenczy
Chief Information Officer

MedStar Good Samaritan Hospital
Catherine Szenczy
Chief Information Officer

MedStar Harbor Hospital
Catherine Szenczy
Chief Information Officer

MedStar Montgomery Medical Center
Catherine Szenczy
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Medstar Union Memorial Hospital
Catherine Szenczy
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Mercy Medical Center
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Peninsula Regional Medical Center
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Prince George's Hospital Center
Dennis Lilik
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Shady Grove Adventist Hospital
Kathleen Dyer
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Sinai Hospital
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William Greskovich
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Suburban Hospital
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Senior Vice President & Chief Information Officer

University of Maryland Rehabilitation & Orthopedic Institute
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Senior Vice President & Chief Information Officer

University of Maryland Shore Medical Center at Chester River Health
Jon Burns
Senior Vice President & Chief Information Officer

University of Maryland Shore Medical Center at Dorchester
Jon Burns
Senior Vice President & Chief Information Officer

University of Maryland Shore Medical Center at Easton
Jon Burns
Senior Vice President & Chief Information Officer

University of Maryland St. Joseph Medical Center
Jon Burns
Senior Vice President & Chief Information Officer

Upper Chesapeake Medical Center
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Washington Adventist Hospital
Kathleen Dyer
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Western Maryland Health System
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APPENDIX A: SURVEY QUESTIONS

Outlined below is the 2012 *Hospital Health Information Technology Survey* (survey), which included the following technologies: electronic health records (EHRs), computerized physician order entry (CPOE), electronic prescribing (e-prescribing), electronic medication administration records (eMARs), bar code medication administration (BCMA), statewide health information exchange (HIE), infection surveillance software, telemedicine, and the meaningful use (MU) of EHRs.

Questions marked with an asterisk directed respondents to answer the planning questions at the end of the survey in the event that their response was "No." Specifically, hospitals that indicated they have not adopted a technology were asked to identify their prospective plans for implementation such as if they plan to assess and/or implement the technology within the next 12 months or beyond or whether they were undecided about plans to adopt the technology.

Section 1: Hospital Departments

Enter the total number of departments within your hospital for each category: emergency department, outpatient, surgical, pediatrics, psychiatric, rehabilitation, inpatient, other (specify). (enter value)

Section 2: CPOE

1) *Has your hospital adopted an order entry system where providers (MD, DO, NP, PA) can electronically enter patient care orders? (If no, answer the *Planning* section below)

    a. How many departments use this technology? (enter value)

    b. Which orders can the provider enter electronically (medication, laboratory, radiology, nursing, respiratory, ultrasound, PT/OT, consultation requests, dietary)?

2) Does this system allow providers (MD, DO, NP, PA) to electronically view the status and results of the electronically entered orders above? (*If no, skip to question 3*)

    a. How many departments use this technology? (enter value)

3) Does this system have an order set feature where a group of orders can be selected based upon the problem or diagnosis? (*If no, skip to question 4*)

    a. How many departments use this technology? (enter value)

4) Does this system offer medication prescribing decision support software for drug-drug interaction checks? *(If no, skip to question 5)*

    a. How many departments use this technology? (enter value)

5) Does this system offer medication prescribing decision support software for drug-allergy interaction checks? *(If no, skip to question 6)*

    a. How many departments use this technology? (enter value)

6) Does this system offer decision support software for medication prescribing for basic dosing guidance? *(If no, skip to question 7)*

    a. How many departments use this technology? (enter value)

Section 3: EHRs

7) *Has your hospital adopted an EHR? (If no, answer the *Planning* section below)

   a. How many departments have this technology? (enter value)

   b. Enter the number of departments that use the following EHR features. Enter zero if the feature is not in use:

   Clinical Documentation

   - Demographic Characteristics of Patients
   - Physicians' Notes
   - Nursing Assessments
   - Problem Lists
   - Medication Lists
   - Discharge Summaries
   - Advance Directives

   Test and Imaging Results

   - Laboratory Reports
   - Radiologic Reports
   - Radiologic Images
   - Diagnostic-test Results
   - Diagnostic-test Images
   - Consultant Reports

   Decision Support

   - Clinical Guidelines
   - Clinical Reminders
   - Drug-laboratory Interaction Alerts (e.g., dioxin and low level of serum potassium)

Section 4: Medication Administration

8) *Has your hospital adopted an electronic medication administration record (eMAR)? (If no, answer the *Planning* section below)

   a. How many departments use this technology? (enter value)

9) *Has your hospital adopted a Bar Code Medication Administration (BCMA) system for medication administration at the bedside? (If no, answer the *Planning* section below)

   a. How many departments use this technology? (enter value)

10) Does your hospital have a medication reconciliation system in place for admission, discharge, and changes in level of care?

Section 5: Infection Management

11) *Has your hospital adopted infection surveillance software to manage infectious diseases? (If no, answer the *Planning* section below)

12) Does your reporting to the National Healthcare Safety Network exceed minimum reporting requirements?

13) Is your hospital linked to the Centers for Disease Control-Alert System?

Section 6: HIE

14) *Has your hospital adopted a system to electronically prescribe (e-prescribe) discharge medications directly to community pharmacies? (If no, answer the *Planning* section below)

    a. How many departments use this technology?

15) *Is your hospital using the Chesapeake Regional Information System for our Patients (CRISP) Portal to query the statewide HIE? (If no, answer the *Planning* section below)

    a. Enter the number of departments that have access to the HIE:

    - Emergency Department
    - Outpatient
    - Surgical
    - Pediatrics
    - Psychiatric
    - Rehabilitation
    - Inpatient
    - Other (specify)

16) If your hospital plans to increase the number of departments querying the HIE, please indicate which departments.

17) *Has your hospital implemented a patient portal? (If no, answer the *Planning* section below)

Section 7: Telemedicine

18) *Has your hospital adopted telemedicine? (If no, answer the *Planning* section below)

19) Is your hospital using telemedicine for the following? *(enter the number of departments that use this technology)*

    - Imaging
    - Diagnostic
    - Monitoring

- Emergency
- Consultation

20) Is your hospital using the following equipment for telemedicine?

- Desktop software
- Handheld wireless monitoring devices
- Interactive video
- Robotics
- Home devices

Section 8: MU

21) Select one of the following to identify your hospital's participation in the Medicare and Medicaid EHR Incentive Programs for calendar year 2012.

- Medicare EHR Incentive Program only (*Skip to question 23*)
- Medicaid EHR Incentive Program only (*Skip to question 22*)
- Both Medicare and Medicaid EHR Incentive Programs (*Skip to question 23*)
- Neither the Medicare nor the Medicaid EHR Incentive Program *(Skip to question 24)*

22) Select one of the following that identifies your hospital's submission to Medicaid for the CMS EHR Incentive Program:

- Adopted an EHR *(Skip to question 24)*
- Implemented an EHR*(Skip to question 24)*
- Upgraded your EHR to a certified version of the system *(Skip to question 24)*
- Demonstrated Meaningful Use *(Skip to question 23)*

23) Enter responses to the following meaningful use measures:

- CPOE (enter threshold, e.g. 30%)
- Drug-Drug, Drug Allergy (attest, yes/no)
- Problem List (enter threshold)
- Medication List (enter threshold)
- Allergy List (enter threshold)
- Demographics (enter threshold)
- Vital Signs (enter threshold)
- Smoking Status (enter threshold)
- Quality Measures (attest, yes/no)
- Decision Support (attest, yes/no)
- Electronic Health Information (enter threshold)
- Discharge Information (enter threshold)

- Exchange Information Electronically (attest, yes/no)
- Protect Electronic Health Information (attest, yes/no)
- Drug Formulary (attest, yes/no)
- Advance Directives (enter threshold)
- Lab Test Results (enter threshold)
- Patient Lists (attest, yes/no)
- Immunization Registries (attest, yes/no)

24) Is your hospital (select one):

- Planning to apply for the Medicare EHR Incentive Program in calendar year 2013?
- Planning to apply for the Medicare EHR Incentive Program in calendar year 2014 or beyond?
- Undecided about applying for the Medicare EHR incentive program at this time?

25) Is your hospital (select one):

- Planning to apply for the Medicaid EHR Incentive Program in calendar year 2013?
- Planning to apply for the Medicaid EHR Incentive Program in calendar year 2014 or beyond?
- Undecided about applying for the Medicaid EHR Incentive Program at this time?

*Planning questions: If no to implementing a technology, is your hospital (select one):

- Assessing within 12 months?
- Implementing within 12 months?
- Implementing with two years or beyond?
- Undecided about adopting at this time?

APPENDIX B: GLOSSARY

Barcode Medication Administration (BCMA): A barcode system designed to prevent medication errors and improve the quality and safety of medication administration. The overall goal of BCMA is to improve accuracy, prevent errors, and generate online records of medication administration.

Clinical Decision Support: Computer application to assist in clinical decisions by providing evidence-based knowledge in the context of patient-specific data.

Clinical Quality Measures: To demonstrate meaningful use successfully, eligible hospitals are required to report on 15 clinical quality measures.

Computerized Physician Order Entry (CPOE): Computer-based application system for providers (MD, DO, NP, PA) to enter patient care orders at the point of care.

CRISP Portal: A standalone system available via the Internet that provides patient health information from Maryland hospitals and other providers who are connected to the HIE.

Electronic Health Record (EHR): A longitudinal collection of electronic health information that serves as a legal medical record, which includes documentation, vital signs, and assessments.

Electronic Medication Administration Record (eMAR): An electronic format of the traditional paper medication administration record.

Electronic Prescribing (e-prescribing): The electronic transmission of prescriptions directly to the dispensing pharmacy by the ordering provider.

Health Information Exchange (HIE): Electronic movement of health-related information among organizations.

Health Information Technology (Health IT): Technology used to maintain health information into electronic format.

Infection Surveillance Software (ISS): An application that monitors the events of infectious disease.

Meaningful Use: Criteria set forth in 42 CFR Parts 412, *et al*. that specifies the initial criteria that an eligible professional (EP) and eligible hospital (EH) must meet in order to qualify for the incentive payment; calculation of the incentive payment amounts; payment adjustments under Medicare for covered professional services and inpatient hospital services provided by EPs and EHs failing to meaningfully use certified EHR technology; and other program participation requirements.

Medicare and Medicaid EHR Incentive Programs: The Health Information Technology for Economic and Clinical Health Act (HITECH) established programs under Medicare and Medicaid to provide incentive payments for the meaningful use of certified EHR technology. The Medicare and Medicaid EHR incentive programs provide incentive payments to eligible professionals and eligible hospitals as they adopt, implement, upgrade or demonstrate meaningful use of certified EHR technology. The programs began in 2011.

Order Set: A group of evidenced-based orders for specific diagnosis or problems.

Patient Portal: A secure online website that gives patients convenient 24-hour access to personal health information from anywhere with an Internet connection. (ONC)

Statewide HIE: A clinical data sharing utility that gives providers access to clinical information, such as patient demographics, laboratory results, radiology reports, discharge summaries, operative and consult notes, and medication fill history.

Telemedicine: Telemedicine means, as it relates to the delivery of health care services, the use of interactive audio, video, or other telecommunications of electronic technology by a health care provider to deliver health care services within the scope of practice of the health care provider at a site other than the site at which the patient is located.

Unit: A hospital department that comprises the major patient care areas and are typical of any hospital despite the size of the facility.

APPENDIX C: MEANINGFUL USE REQUIREMENT ATTAINMENT BY HOSPITAL

Each stage of MU requirements is segmented into both core and menu objectives. There are 23 MU objectives, 13 required core objectives and 10 menu objectives (of which 5 must be selected and achieved) for hospitals to receive an incentive payment. The MU requirements are measured through attestations and thresholds. Attestation requires EPs and EHs to prove (attest) that they have met a specific requirement of MU with a certified EHR. Thresholds are used to calculate the numerical frequency of usage of specific software applications. The Medicaid incentive program allows EPs and EHs to attest to adopting, implementing, or upgrading their EHR system to a certified EHR system for the first year of payment and must achieve MU in subsequent years of participation. Hospitals may select to participate in the Medicare incentive program, Medicaid incentive program, or both programs. There are different eligibility requirements for each incentive program.

MEANINGFUL USE CORE MEASURE REQUIREMENTS

The table below identifies hospital achievements for each MU core objective through December 2012 including threshold percentages achieved where applicable.

HOSPITAL *MU Objective* / *Threshold Requirement*	CPOE 30%	Drug-Drug, Drug Allergy Attest	Problem List 80%	Medication List 80%	Decision Support Attest	Electronic Health Information 50%	Discharge Information 50%	Exchange Information Attest	Protect Information Attest
Medicare & Medicaid *n=14*									
Calvert Memorial Hospital	50	✓	91	100	✓	0	0	✓	✓
Doctors Community Hospital	80	✓	95	92	✓	0	0	✓	✓
Edward McCready Memorial Hospital	100	✓	98	98	✓	0	0	✓	✓
Frederick Memorial Hospital	89.9	✓	100	100	✓	100	100	✓	✓
Johns Hopkins Bayview Medical Center	98	✓	92	98	✓	100	0	✓	✓
Johns Hopkins Hospital	99	✓	96	99	✓	100	100	✓	✓
MedStar Montgomery Medical Center	79	✓	82	100		100	100	✓	✓
MedStar St. Mary's Hospital	94	✓	95	98	✓	100	0	✓	✓
Mercy Medical Center	67	✓	94	100	✓	100	86	✓	✓
Northwest Hospital Center	94	✓	90	94	✓	100	100	✓	✓
Sinai Hospital	96	✓	91	93	✓	99	100	✓	✓
St. Agnes Hospital	94	✓	97	84	✓	100	100	✓	✓
Suburban Hospital	59	✓	93	96	✓	100	100	✓	✓
Western Maryland Health System	60	✓	100	100	✓	100	0	✓	✓
Average	**83**	**14**	**94**	**97**	**14**	**79**	**56**	**14**	**14**
Medicare Only *n=10*									
Anne Arundel Medical Center	100	✓	96	100	✓	91	100	✓	✓
Atlantic General Hospital	85	✓	60	85	✓	85	80	✓	✓

HOSPITAL	*MU Objective*	CPOE	Drug-Drug, Drug Allergy	Problem List	Medication List	Decision Support	Electronic Health Information	Discharge Information	Exchange Information	Protect Information
	Threshold Requirement	30%	Attest	80%	80%	Attest	50%	50%	Attest	Attest
Carroll Hospital Center		99	✓	93	99	✓	100	100	✓	✓
Fort Washington Hospital		94	✓	97	99	✓	0	0	✓	✓
Greater Baltimore Medical Center		90	✓	0	91	✓	98	100	✓	✓
Harford Memorial Hospital		52	✓	99	99	✓	0	82	✓	✓
Meritus Medical Center		83	✓	96	91	✓	0	0	✓	✓
Peninsula Regional Medical Center		87	✓	87	99	✓	0	0	✓	✓
Upper Chesapeake Medical Center		62	✓	100	99	✓	0	72	✓	✓
Union Hospital of Cecil County		96	✓	97	100	✓	60	100	✓	✓
Average		**85**	**10**	**83**	**96**	**10**	**43**	**63**	**10**	**10**

** Holy Cross Hospital received a Medicare incentive payment, however, did not provide the MU attestation and threshold achievements.*

MEANINGFUL USE CORE REQUIREMENTS (CONTINUED)

HOSPITAL	*MU Objective*	Medication Allergy List	Demographics	Vital Signs	Smoking Status	Quality Measures
	Threshold Requirement	80%	50%	50%	50%	Attest
Medicare & Medicaid *n=14*						
Calvert Memorial Hospital		100	99	99	98	✓
Doctors Community Hospital		99	100	96	87	✓
Edward McCready Memorial Hospital		98	99	93	95	✓
Frederick Memorial Hospital		99	98	82	96	✓
Johns Hopkins Bayview Medical Center		99	97	78	79	✓
Johns Hopkins Hospital		93	99	81	91	✓
MedStar Montgomery Medical Center		98	99	92	90	✓
MedStar St. Mary's Hospital		98	97	82	93	✓
Mercy Medical Center		100	80	64	63	✓
Northwest Hospital Center		97	99	77	74	
Sinai Hospital		99	99	83	82	
St. Agnes Hospital		99	99	80	98	✓
Suburban Hospital		95	96	91	95	✓

HOSPITAL	*MU Objective*	Medication Allergy List	Demographics	Vital Signs	Smoking Status	Quality Measures
	Threshold Requirement	80%	50%	50%	50%	Attest
Western Maryland Health System		100	84	93	98	
Average		**98**	**96**	**85**	**89**	**11**
Medicare Only *n=10*						
Anne Arundel Medical Center		100	87	98	97	✓
Atlantic General Hospital		85	90	90	95	✓
Carroll Hospital Center		100	99	96	86	✓
Fort Washington Hospital		99	100	99	100	✓
Greater Baltimore Medical Center		99	99	81	97	✓
Harford Memorial Hospital		98	98	99	100	✓
Meritus Medical Center		99	92	82	96	
Peninsula Regional Medical Center		93	99	83	81	✓
Upper Chesapeake Medical Center		98	99	100	100	✓
Union Hospital of Cecil County		100	100	85	99	✓
Average		**97**	**96**	**91**	**95**	**9**

** Holy Cross Hospital received a Medicare incentive payment, however, did not provide the MU attestation and threshold achievements.*

MEANINGFUL USE MENU OBJECTIVES

The table below identifies hospital achievements for each MU menu objective as of December 2012 including threshold percentages achieved where applicable.

HOSPITAL	*MU Objective*	Drug Formulary	Advanced Directives	Lab Results	Patient List	Immunization Registries
	Threshold Requirement	Attest	50%	40%	Attest	Attest
Medicare and Medicaid *n=14*						
Calvert Memorial Hospital		✓	99	100	✓	
Doctors Community Hospital		✓	No response	100	✓	✓
Edward McCready Memorial Hospital		✓	87	89	✓	
Frederick Memorial Hospital		✓	99	100	✓	✓
Johns Hopkins Bayview Medical Center		✓	84	99	✓	✓
Johns Hopkins Hospital		✓	94	87	✓	✓
MedStar Montgomery Medical Center		✓	86	84	✓	✓

HOSPITAL	*MU Objective*	Drug Formulary	Advanced Directives	Lab Results	Patient List	Immunization Registries
	Threshold Requirement	Attest	50%	40%	Attest	Attest
MedStar St. Mary's Hospital		✓	100	No response	✓	✓
Mercy Medical Center		✓	79	93	✓	✓
Northwest Hospital Center		✓	94	98	✓	✓
Sinai Hospital		✓	96	97	✓	✓
St. Agnes Hospital		✓	100	100	✓	
Suburban Hospital		✓	86	100	✓	✓
Western Maryland Health System		✓	99	100	✓	✓
Average		**14**	**93**	**96**	**14**	**12**
Medicare Only *n=10*						
Anne Arundel Medical Center		✓	98	100	✓	✓
Atlantic General Hospital		✓	90	90	✓	✓
Carroll Hospital Center		✓	96	100	✓	✓
Fort Washington Hospital		✓	100	99	✓	✓
Greater Baltimore Medical Center		✓	99	100	✓	✓
Harford Memorial Hospital		✓	99	100	✓	✓
Meritus Medical Center		✓	99	98	✓	
Peninsula Regional Medical Center		✓	94	100	✓	
Upper Chesapeake Medical Center		✓	99	100	✓	✓
Union Hospital of Cecil County		✓	99	100	✓	
Average		**10**	**97**	**99**	**10**	**7**

** Holy Cross Hospital received a Medicare incentive payment, however, did not provide the MU attestation and threshold achievements.*

APPENDIX D: SUMMARY OF HOSPITAL HEALTH IT ADOPTION WITHIN HOSPITAL UNITS

The table below identifies the number of units within each hospital using the technology listed. It also identifies which hospitals have implemented ISS and telemedicine.

Hospital *n=46*	Total Units #	EHRs		e-Prescribe		CPOE		eMAR		BCMA		ISS	Telemedicine
		# Unit	% Unit	# Unit	% Unit	# Unit	% Unit	# Unit	% Unit	# Unit	% Unit		
Anne Arundel Medical Center	35	35	100	8	22	35	100	35	100	23	66		✓
Atlantic General Hospital	14	7	50	5	1	6	43	5	35	5	35		✓
Baltimore Washington Medical Center	33	33	100	16	48	33	100	19	58	0	0	✓	✓
Bon Secours Baltimore Health System	11	0	0	0	0	0	0	0	0	0	0		✓
Calvert Memorial Hospital	26	17	65	0	0	5	19	15	58	12	46		✓
Carroll Hospital Center	13	12	92	0	0	12	92	12	92	12	92	✓	✓
Civista Medical Center	19	19	100	0	0	1	5	2	11	2	11		
Doctors Community Hospital	19	19	100	0	0	1	5	19	100	10	53	✓	✓
Edward McCready Memorial Hospital	8	8	100	3	38	8	100	2	25	0	0	✓	
Fort Washington Hospital	21	3	14	0	0	3	14	10	48	3	14		
Frederick Memorial Hospital	24	24	100	0	0	24	100	23	96	19	83	✓	✓
Garrett County Memorial Hospital	9	4	44	0	0	1	11	1	11	1	11		
Greater Baltimore Medical Center	23	23	100	23	100	23	100	17	74	17	74		
Harford Memorial Hospital	7	3	43	0	0	7	100	3	43	3	43	✓	
Holy Cross Hospital	27	27	100	0	0	27	100	27	100	23	85	✓	✓
Howard County General Hospital	30	19	63	0	0	19	63	19	63	19	63	✓	✓
Johns Hopkins Bayview Medical Center	25	24	96	0	0	23	92	23	92	23	92		
Johns Hopkins Hospital	16	16	100	0	0	16	100	16	100	0	0	✓	✓
Laurel Regional Hospital	10	0	0	0	0	0	0	0	0	0	0		
MedStar Franklin Square Medical Center	47	15	32	0	0	3	5	18	38	15	32		✓
MedStar Good Samaritan Hospital	18	18	100	0	0	0	0	12	67	12	67		✓
MedStar Harbor Hospital	25	9	36	24	96	9	36	9	36	9	36	✓	
MedStar Montgomery Medical Center	18	18	100	0	0	18	100	18	100	17	94		✓
MedStar Southern Maryland Hospital Center	10	0	0	0	0	0	0	0	0	0	0		
MedStar St. Mary's Hospital	13	13	100	10	77	13	100	10	77	10	77		✓
MedStar Union Memorial Hospital	53	4	8	53	100	53	100	51	96	53	100	✓	

Hospital *n=46*	Total Units #	EHRs		e-Prescribe		CPOE		eMAR		BCMA		ISS	Telemedicine
		# Unit	% Unit	# Unit	% Unit	# Unit	% Unit	# Unit	% Unit	# Unit	% Unit		
Mercy Medical Center	28	18	64	0	0	17	61	18	64	18	64	✓	✓
Meritus Medical Center	23	23	100	0	0	1	4	15	65	15	65	✓	✓
Northwest Hospital Center	23	23	100	0	0	20	87	16	69	16	69	✓	
Peninsula Regional Medical Center	24	24	100	0	0	24	100	24	100	24	100	✓	✓
Prince George's Hospital Center	8	0	0	0	0	0	0	0	0	0	0	✓	
Shady Grove Adventist Hospital	23	23	100	0	0	1	4	23	100	23	100		
Sinai Hospital	19	19	100	0	0	19	100	19	100	19	100	✓	
St. Agnes Hospital	69	69	100	0	0	17	25	22	32	14	20	✓	
Suburban Hospital	14	14	100	0	0	4	29	8	57	8	57		✓
Union Hospital of Cecil County	15	15	100	0	0	15	100	4	27	22	100	✓	✓
University of Maryland Medical Center	105	105	100	60	57	79	75	15	14	0	0	✓	✓
University of Maryland Medical Center Midtown Campus	15	15	100	0	0	0	0	11	73	11	73	✓	
University of Maryland Rehabilitation & Orthopedic Institute	28	19	68	19	68	19	68	19	68	0	0		
University of Maryland Shore Medical Center at Chester River Health	5	5	100	0	0	1	20	4	80	3	60		
University of Maryland Shore Medical Center at Dorchester	6	6	100	0	0	1	16	5	83	4	66		
University of Maryland Shore Medical Center at Easton	15	15	100	0	0	2	13	11	73	8	53		
University of Maryland St. Joseph Medical Center	26	0	0	0	0	0	0	15	75	0	0	✓	
Upper Chesapeake Medical Center	7	7	100	0	0	7	100	14	24	2	29	✓	
Washington Adventist Hospital	18	18	100	0	0	1	6	2	11	18	100		
Western Maryland Health System	35	35	100	0	0	1	3	16	46	16	46	✓	
Totals	**1,060**	**844**	**80**	**221**	**21**	**569**	**54**	**627**	**59**	**509**	**48**	**24**	**21**

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